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- (71) Applicant: **SPALDING SPORTS WORLDWIDE, INC.** [US/US]; 425 Meadow Street, P.O. Box 901, Chicopee, MA 01021-0901 (US).
- (74) Agent: **BUGBEE, Michelle**; Spalding Sports Worldwide, Inc., 425 Meadow Street, P.O. Box 901, Chicopee, MA 01021-0901 (US).
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- (72) Inventors: **FEENEY, Brian, P.**; 19 Treetop Lane, East Windsor, CT 06016 (US). **TOUHEY, Daniel, P.**; 29 San Souci Drive, South Hadley, MA 01075 (US). **STAHL,**
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*



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(54) Title: SELF CONTAINED SPORT BALL INFLATION PUMP

(57) Abstract: An inflatable sport ball, such as a basketball, a football, a soccer ball, a volley ball or a playground ball, is provided with a self-contained inflation mechanism for inflating or more likely adding pressure to the ball. The mechanism is a battery-operated, diaphragm pump which is inside of the ball with a switch which is operable from outside of the ball to pump ambient air into the ball.

Self Contained Sport Ball Inflation Pump

This application claims the benefit of U.S. Provisional Application No. 60/159,311, filed October 14, 1999.

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Background of the Invention

The present invention relates to sport balls which contain a pump for inflating or adding pressure to the balls.

Conventional inflatable sport balls, such as basketballs, footballs, soccer balls, volley balls and playground balls, are inflated through a traditional inflation valve using a separate inflation needle that is inserted into and through a self-sealing inflation valve. A separate pump, such as a traditional bicycle pump, is connected to the inflation needle and the ball is inflated using the pump. The inflation needle is then withdrawn from the inflation valve which self-seals to maintain the pressure. This system works fine until the sport ball needs inflation or a pressure increase and a needle and/or pump are not readily available.

Summary of the Invention

The present invention provides a sport ball which has a self-contained inflation mechanism. The object is to be able to inflate or add pressure to a sport ball without the need for separate inflation equipment such as a separate inflation needle and pump. Specifically, the invention relates to a sport ball which has a self-contained pump device which is operable from outside the ball and which pumps ambient air into the ball to achieve the desired pressure. More specifically, the pump device is a battery operated electric pump within the ball with means for admitting ambient air into the pump and

discharging that air through one-way valve means into the interior volume of the ball.

Brief Description of the Drawings

5 Figure 1 shows a cross section of a portion of a sport ball with a self-contained electric pump and battery operable from outside the ball for adding air pressure to the ball.

 Figure 2 is a cross section of another portion of the sport ball showing a pressure relief valve.

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Description of the Preferred Embodiment

 Referring to the drawing, a portion of a sport ball 10 is illustrated incorporating the pump of the present invention. The ball which is illustrated is a typical basketball construction comprising a carcass
15 having a rubber bladder 12 for air retention, a layer 14 composed of layers of nylon or polyester yarn windings wrapped around the bladder and an outer rubber layer 16. For a laminated ball, an additional outer
layer 18 of leather or a synthetic comprises panels which are applied by adhesive and set by cold molding. The windings are randomly oriented
20 and two or three layers thick and they form a layer which cannot be extended to any significant degree and which restricts the ball from expanding to any significant extent above its regulation size when
inflated above its normal playing pressure. This layer for footballs, volleyballs and soccer balls is referred to as a lining layer and is usually
25 composed of cotton or polyester cloth that is impregnated with a flexible binder resin such as vinyl or latex rubber.

 Incorporated into the carcass of the ball of the invention during the formation is the rubber pump housing 20 with a recess 22 and with a flange 24 which is bonded to the bladder using a rubber adhesive.

The recess 22 in the housing 20 is configured to hold the pump 26 firmly in place.

The electric pump 26 is a mini or micro battery operated, diaphragm air pump of which there are a number of commercially available models such as from Sensidyne OEM Division of Clearwater, Florida and T Squared Manufacturing of Lincoln Park, New Jersey. Mounted on the pump 26 is a replaceable battery 28 similar to a watch battery. The battery 28 is mounted with a switch 30 connected between the battery and the electrical motor of the pump. The tube 32 is connected to the inlet of the pump 26 for admitting ambient air into the pump. The outlet of the pump 26 is connected by the tube 34 to a one-way duckbill valve 36 for admitting air from the pump 26 to the interior of the ball and for preventing the flow of air back out of the ball. The switch 30 is accessible by lifting the flap 38 comprising the layers 16 and 18. The flap 38 can be held down by velcro between the flap 38 and the underlying layer.

Although the pump assembly of the invention is small and lightweight, perhaps only about 40 grams or less, it is desirable that a weight be added to the ball structure to counterbalance the weight of the pump assembly. For example, a standard needle valve may be located on the opposite side of the ball. The material forming the needle valve may be weighted to counterbalance the pump assembly. Alternately, an area opposite the pump could be composed of thicker rubber so as to counterbalance the pump.

Since the pressure in a sport ball can be too high through overinflation or a temperature increase, it is advisable to have a way to bleed pressure from the ball when the conventional inflating needle is not available. Such an arrangement is shown in Figure 2 involving an automatic, self-regulating, adjustable pressure relief valve 40. This

comprises an aperture 42 through the carcass covered on the inside by the cup-shaped enclosure 44. The enclosure 44 has an opening 46 with a valve seat 48. The valve 50 seals against the valve seat 48 to hold the pressure in the ball. The valve stem 52 is threaded through a disk 54 whereby the disk 54 can be moved axially on the valve stem 52 by turning the head 56 of the valve stem 52. A spring 58 is located around the valve stem 52 between the disk 54 and the carcass. Therefore, turning the head 56 and valve stem 52 moves the disk 54 axially on the valve stem and adjusts the pressure of the spring 58. The pressure of the spring 58 is adjusted such that an over pressure in the ball will force the valve to open and bleed pressure and then close when the desired pressure is reached. Alternately, a manual pressure relief valve can be provided by merely reversing the slope on the valve 50 and the valve seat 48 and placing the spring on the opposite side of the disk 54 whereby pressure applied to the head 90 will compress the spring and open the valve.

Claims:

1. An inflatable sport ball comprising an integral battery-operated pump.
- 5 2. An inflatable sport ball as recited in claim 1 wherein said ball includes a layer which prevents the ball from expanding significantly as pressure is increased.
- 10 3. An inflatable sport ball as recited in claim 1 wherein said pump includes means for pumping ambient air into said ball and means for preventing said pumped air from escaping out of said ball.
- 15 4. An inflatable sport ball comprising a carcass and an internal pump assembly attached to said carcass, said pump assembly including an electric pump, an air inlet into said pump, an air outlet including a one-way valve from said pump into said ball, permitting air flow from said pump into said ball and preventing air flow from said ball back into said pump and a battery connected to said pump through a switch, said switch being actuatable from outside said ball.
- 20 5. An inflatable sport ball as recited in claim 1 wherein said sport ball is a basketball.
- 25 6. An inflatable sport ball as recited in claim 1 wherein said sport ball is a volley ball.
7. An inflatable sport ball as recited in claim 1 wherein said sport ball is a football.

8. An inflatable sport ball as recited in claim 1 wherein said sport ball is a soccer ball.
9. An inflatable sport ball as recited in claim 1 wherein said sport ball is a playground ball.
10. An inflatable sport ball as recited in claim 1 and further including means for releasing pressure from said ball.
- 10 11. An inflatable sport ball as recited in claim 10 wherein said means for releasing pressure comprises an adjustable automatic pressure relief valve.

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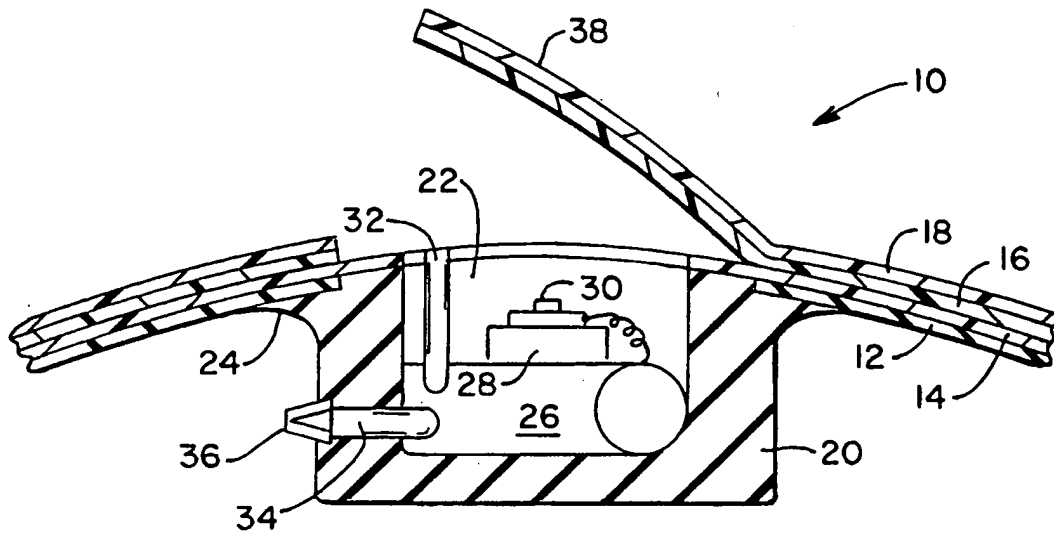


FIG. 1

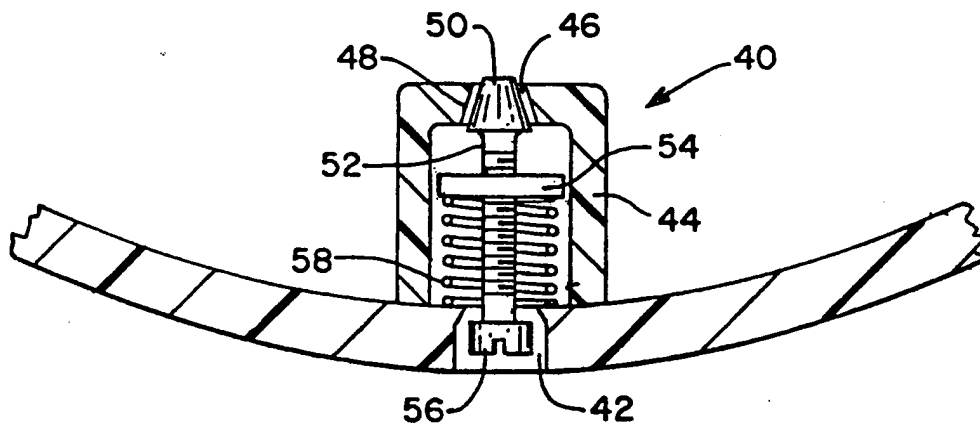


FIG. 2

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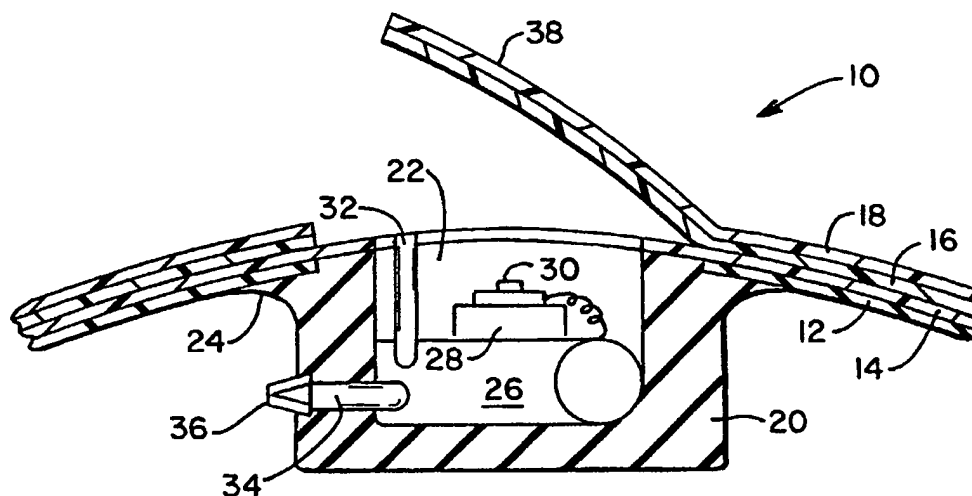
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- (72) Inventors: FEENEY, Brian, P.; 19 Treetop Lane, East Windsor, CT 06016 (US). TOUHEY, Daniel, P.; 29 San Souci Drive, South Hadley, MA 01075 (US). STAHL, For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A63B41/12 A63B43/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A63B A47C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 93 18826 A (WEISS TWICE TOYS INC) 30 September 1993 (1993-09-30) claim 1; figures page 3, line 15 - line 19 ---	1-4, 7-10
A	US 5 098 095 A (WEISS JOHN S) 24 March 1992 (1992-03-24) claims 1,2; figure 1 column 1, line 53 - line 56 ---	1-4, 7-10
A	US 3 119 617 A (BERNARD TOPPER) 28 January 1964 (1964-01-28) claims 1,2; figures ---	1-4, 10, 11
A	US 5 755 634 A (HUANG TIEN-TSAI) 26 May 1998 (1998-05-26) claims 1,2; figure 1 -----	1



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

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* & * document member of the same patent family

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European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Stach, R

INTERNATIONAL SEARCH REPORT

Information on patent family members

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